UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF MASSACHUSETTS

ANYWHERECOMMERCE, INC. and BBPOS LIMITED, **Plaintiffs,** **v.** **INGENICO INC., INGENICO CORP., and INGENICO GROUP SA,** **Defendants.**	**Civil Docket No: 1:19-cv-11457-IT**

BBPOS LIMITED'S PROPOSED FINDINGS OF FACT

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I. Introduction

1. BBPOS Limited ("BBPOS") is a limited liability company that was founded in Hong Kong in 2008 by Ben Lo, Jimmy Tang, and Daniel Tsai. BBPOS designs mobile point-of-sale ("mPOS") devices for large-scale customers, such as PayPal, who then provide mPOS devices to merchants. Day 4 Trial Tr., Doc. No. 349 at 65. Prior to founding BBPOS, Lo and Tang had experience developing traditional point-of-sale terminals. Doc. No. 349 at 65. A traditional POS device is a larger device designed to remain in a fixed location. By contrast, an mPOS device is designed for mobile use.
2. From about 2008 to 2010, BBPOS worked to develop its first mPOS device, called the CircleSwipe. Doc. No. 349 at 66–67. In 2010, BBPOS entered into the Engineering Development and License Agreement with ROAM Data ("ROAM"), which granted ROAM the exclusive right to use and sell the CircleSwipe. Ex. 1.
3. From 2010 to 2012, BBPOS continued to develop its mPOS technology by improving upon its existing products and preparing for the next generation of mPOS products. Day 5 Trial Tr., Doc. No. 350 at 45. In particular, BBPOS was preparing to manufacture EMV-capable mPOS products.[1]
4. By February of 2012, BBPOS had developed five "key designs"[2] that were used in its mPOS products and would be utilized in future mPOS products, including next-generation EMV mPOS devices. As further described in Section II, below, the five key designs developed by

[1] As mentioned by Defendants' counsel in opening statements, EMV stands for "Europay, Mastercard, Visa" and refers to a payment method based on a technical standard for smart payment cards and for payment terminals (such as mPOS devices) which can accept them. Doc. No. 346 at 59; Doc. No. 348 at 76–77. In lay terms, these are "chip cards" and "chip readers." *Id.*

[2] During the trial, BBPOS' five claimed trade secrets were, at times, referred to as its "key designs." Doc. No. 349 at 67, *et seq.*

BBPOS are (1) polarity detection and correction, (2) power management / temp sleep and wake-up, (3) automatic gain control, (4) communication formats, and (5) modified DUKPT encryption. Doc. No. 349 at 68. The key designs were first implemented into mPOS devices that connected to a mobile phone through an audio jack. *Id.*

5. All five trade secrets were misappropriated by Defendants Ingenico Group SA., Ingenico Corp., and Ingenico Inc. (collectively, "Ingenico").[3] BBPOS revealed the key designs to ROAM and Ingenico, at the instruction of ROAM CEO and founder Will Graylin and ROAM Product Manager Christopher Rotsaert, who also was an employee of Ingenico. Doc. No. 350 at 143; Ex. 406; Doc. No. 349 at 103. The information was provided by BBPOS between February 2012 and July 2012. *See, e.g.*, Doc. No. 347 at 10, 12–13, 24–25, 35–36, 39–40, 55, 61; Ex. 372; Ex. 138, Ex. 143; Ex. 118; Ex. 80; Ex. 784; Doc. No. 349 at 73–74, 76, 82, 85–86, 88, 90–109, 111, 115; Ex. 406; Ex. 588; Ex. 590; Ex. 68; Ex. 72; Ex. 73; Ex. 144; Ex. 145; Ex. 146; Ex. 371.

6. The information sharing served two purposes. First, contemporaneous with Ingenico's acquisition of a controlling 70% ownership stake in ROAM, ROAM and Ingenico began due diligence for a potential BBPOS acquisition that Graylin was urging Ingenico, operating through ROAM, to swiftly complete in order to secure BBPOS' intellectual property portfolio and talent. Day 3 Trial Tr., Doc. No. 348 at 14, 16, 18–19, 30. Second, even if an acquisition did not take place, all parties were contemplating entering into a joint development agreement

[3] By February 2012, Ingenico Corp. was a majority stakeholder in ROAM. Doc. No. 348 at 14. ROAM would become Ingenico Inc. following 100% acquisition and merger of ROAM by Ingenico Corp. in December 2017. *See* Doc. No. 350 at 115.

for the next generation of EMV-capable mPOS devices. Doc. No. 348 at 89; Doc. No. 350 at 144;[4] Doc. No. 348 at 89.

7. The acquisition did not occur, and thereafter, Graylin discovered that Rotsaert was transferring ROAM and BBPOS intellectual property outside of the initial control group (consisting of Rotsaert and two Ingenico engineers) for what he suspected was development of a competing Ingenico mPOS device. Ex. 122, Ex. 175, Ex. 172, Ex. 168. Shortly after raising his concerns with Rotsaert and the ROAM board of directors, Graylin was terminated by the ROAM board of directors in September 2012, which was at the time controlled by Ingenico executives, including Ingenico then-CEO Philippe Lazare and Ingenico COO Christopher Coonen. Doc. 348 at 63; Day 9 Trial Tr., Doc. No. 354 at 32–33; Ex. 168.

8. About three weeks after Graylin was fired, in October 2012, ROAM and Ingenico entered into a development agreement for a next generation mPOS device with Ingenico's recently acquired Chinese hardware manufacturer, Fujian Landi Commercial Equipment Co Ltd. ("Landi") Ex. 214. Graylin was unaware of the agreement. Doc. No. 348 at 65.

9. In late 2012 / early 2013, Lo became aware that Ingenico and ROAM were developing a new mPOS device that would compete with existing and future BBPOS mPOS devices. Day 6 Trial Tr., Doc. No. 351 at 126–128; Ex. 200. Concerned that Ingenico and ROAM were utilizing BBPOS intellectual property, Lo sought assurances from his contact at ROAM, COO Bill Bachrach. *Id*. Lo received an email response from ROAM's new CEO, Ken Paull, who expressly assured Lo that there was "no commonality" in any of the key designs between the BBPOS product and the new competing product. Ex. 200.

[4] Rotsaert testified that "If the conclusion of the prestudy had been positive, yes, it would have been co-developments sic, Valence [the city where Ingenico was headquartered] with BBPOS." Doc. No. 350 at 144.

10. The new ROAM / Ingenico competing product, the RP350x, would not become commercially available until July 2014. Doc. No. 350 at 118, 129; Ex. 473. Thereafter, in late 2014, Lo saw the RP350x at a tradeshow and now suspected that Ingenico was utilizing BBPOS' key designs. Doc. No. 351 at 128–130. BBPOS engineers were able to obtain an RP350x a few months later, and upon opening it, discovered certain BBPOS key designs in the product. *Id*. Although BBPOS and Lo did not have the finances or time to pursue claims for theft immediately (Day 7 Trial Tr., Doc. No. 352 at 7–9), in early 2018, Lo met with a financial advisor in the United States who referred him to an attorney. *Id*.

11. Plaintiff's technical expert witness, Ivan Zatkovich, was retained and thereafter concluded that the five of BBPOS' key designs appeared in four different Ingenico products or series, including the RP100 (including the RP100x, RP150x, RP170c); RP350x; RP450 (including the RP456, RP457c[5]); and RP750 (including the RP750x, RP755x, P757cx) (collectively, the "Accused Products"). Day 1 Trial Tr., Doc. No. 346 at 106; Day 2 Trial Tr., Doc. No. 347 at 14-18, 25-30, 40-45, 52-54, 56-57, 62; *cf.* Exs. 372 and 208; Ex. 817 (demonstrative purposes); Ex. 193; *cf.* Exs. 118 and 208; Ex. 207; Ex. 192; Ex. 193; Ex. 199; Ex. 209; Ex. 217; Doc. No. 349 at 112-118; *cf.* Exs. 451A and 207; *cf.* Exs. 371 and 207.

II. The Claimed Trade Secrets

12. Since its inception, BBPOS has been engaged in developing mPOS devices for its customers. Doc. No. 349 at 64–65.

13. With the "age of smartphone [] coming," Lo, and his partners, Tang and Tsai, founded BBPOS in 2008 "to come up with a really low-cost device, which can work together with all the

[5] The RP457c-BT is not part of the Accused Products. See Section XIV below.

smartphones and convert a smartphone into a point-of-sales terminal." Doc. No. 349 at 68; Doc. No. 351 at 103–104.

14. Lo, Tang, and Tsai "spent a lot of time and years of research," "buying hundreds of the phones in the market," so that ". . . by 2010, BBPOS had come up with the first product which can really work with almost majority of the smartphones and then it can finish transactions in seconds." Doc. No. 351 at 105–106.

15. That product was the CircleSwipe; this is the same product that later became the G3X, G4X, and G5X series that BBPOS sold to ROAM under a 2010 Engineering Development and License Agreement. Doc. No. 348 at 75–76; Doc. No. 350 at 27–28; Ex. 1. Both Lo and Graylin—the parties who negotiated the Licensing Agreement—agreed that it was only intended to apply to the CircleSwipe product, not future mPOs devices. Doc. No. 348 at 74; Doc. No. 351 at 108–109.

16. By February of 2012, BBPOS had developed and maintained five key designs that were used in its mPOS products and would be utilized in its future mPOS products, including next-generation EMV-capable mPOS products. Doc. No. 346 at 101; Doc. No. 349 at 68.

17. Each of the five key designs were invented by Tang and Tsai, among others, and are proprietary IP that BBPOS developed, maintained, and kept secret from its competitors for accomplishing (1) polarity detection and correction, (2) power management / temp sleep and wake-up, (3) automatic gain control, (4) communication formats, and (5) modified DUKPT encryption. Doc. No. 349 at 68–69, 71, 75–76, 80–81, 83, 86–87; Doc. No. 346 at 101; Doc. No. 347 at 64–65; Doc. No. 349 at 68; Ex. 817 (demonstrative purposes).

18. These key designs were first implemented by BBPOS into mPOS devices that connected to a mobile phone through an audio jack. Doc. No. 349 at 68.

19. Each of BBPOS' five key designs had value – first, in capturing an emerging mPOS market segment with its high-quality and low-cost mPOS devices featuring an audio jack interface; and then, in retaining those customers as BBPOS' supported product offerings expanded (i.e., the "customer stickiness" aspects of the trade secrets). Doc. No. 347 at 6, 22–23, 32–35, 38, 52-55, 58–63; Ex. 817 (demonstrative purposes); Doc. No. 349 at 71, 74, 77–80, 82–88, 94, 118; Ex. 451A; Ex. 207.

20. None of the five key designs were generally known at the time of BBPOS' disclosures to Ingenico in 2012 or otherwise readily ascertainable, as discussed in further detail in the subsections below. Doc. No. 347 at 17, 19, 30–32, 44–46, 49–52, 57–58, 62; Doc. No. 349 at 14, 72–73, 75–76, 80–84, 89.

21. Although certain generalized concepts related to the key designs may have existed prior to June 30, 2012, which is the look-back period primarily used by Defendants' rebuttal expert Dr. Michael Shamos in compiling the prior art admitted at trial, *see* Day 8 Trial Tr., Doc. No. 353 at 14, 103,[6] Shamos conceded that *none* of these prior art references revealed the entirety of any one of BBPOS' five claimed trade secrets. Doc. No. 353 at 98-107.

22. Specifically, Shamos testified:

> Q. Okay. And those patents -- and I think I identified them previously. We just walked through them. You would agree with me that the reason why you were presenting these patents is to -- to support your conclusion that Mr. Zatkovich was wrong when he said that it was unusual at this time period to connect digital devices to audio jack of a mobile phone. Is that fair?

[6] Pre-June 30, 2012 Prior Art References: Ex. 622; Ex. 669; Ex. 674; Ex. 676; Ex. 677; Ex. 678; Ex. 679; Ex. 680; Ex. 681; Ex. 682; Ex. 683; Ex. 684; Ex. 685; Ex. 686; Ex. 690; Ex. 692; Ex. 693; Ex. 696 + 1143.

Post-June 30, 2012 Prior Art References: Ex. 633 (Texas Instrument Spec Sheet – "AUGUST 2012—REVISED MAY 2013"); Ex. 689 (Chan Patent – "November 22, 2012").

> **A. Yes.**
>
> Q. Okay. And you would agree with me, though, that even this compilation of eleven patents, none of them actually reveal, in the entirety, any of the five key designs that have been identified in this case, correct?
>
> **A. I agree. That's not why I offered them.**
>
> Q. Okay. So it was limited to rebutting this -- the statement that was in Mr. Zatkovich's report; is that right?
>
> **A. Yes.**
>
> Q. Okay. And in none of those patents that we discussed, the eleven, none of that prior art, the compiled prior art, show any of the identical circuitry that has been -- that was identified in Mr. Zatkovich's reports in this case?
>
> **A. That's right.**

Doc. No. 353 at 107. (emphasis supplied).

23. Moreover, despite having conducted an extensive search, neither BBPOS' technical expert, Zatkovich, nor Shamos was able to find any other active device that transmitted digital data via audio jack port and was commercially available as of 2012 or earlier.[7] Doc. No. 346 at 118; Doc. No. 347 at 88; Doc. No. 353 at 101–102.

24. Prior to 2012, it was undisputed that neither Ingenico, nor its then-newly acquired hardware manufacturing arm in China, Landi, had successfully completed a working mPOS prototype; in fact, neither one had any mPOS devices in active product development, if at all.[8] Doc. No. 348 at 43.

[7] Tang similarly testified that, in 2012, he was aware of no other mPOS devices that had a solution to polarity detection and correction. Doc. No. 349 at 69.

[8] Graylin testified that, as of June 2012, Ingenico was starting to push him to consider Landi as a replacement mPOS hardware supplier for BBPOS, if the contemplated BBPOS acquisition fell

25. Despite more resources, global name recognition, and thousands of employees, Ingenico and Landi lacked BBPOS' capabilities and mPOS know-how, at that time, to address the unique problems associated with attempting to retrofit an audio jack port (which was originally designed and intended to transmit music and voice) to reliably transmit digital data for mPOS transactions in a compact and low-cost device more that is accessible to smaller merchant market sectors, while keeping pace with the growing consumer demand. *Id.*; Doc. No. 347 at 11–12; Ex. 791; Doc. No. 351 at 109–110; Doc. No. 346 at 113–116; Doc. No. 348 at 20.

26. Ingenico presented no competent evidence at trial to the contrary, notwithstanding that any relevant documents or witnesses – anything that might explain how the key designs made their way into Ingenico's products – were under Ingenico's custody and control.

27. By February 2012, Rotsaert (via ROAM) was tasked to lead the cooperation between BBPOS, ROAM and Ingenico in a joint development project to bring a next generation, EMV-capable mPOS reader to the marketplace as quickly as possible. Doc. No. 351 at 75-76. Doc. No 350 at 143. In an email he sent to Lo in March 2012, Rotsaert floated the idea of using a new Landi "platform" for the project, stating:

> Nevertheless, this platform is quite new in Landi and not all features are yet available: in particular, swipe, audio jack interface & power management are not ready. I'd like to discuss with you at Cartes & next week on how we could manage to move fast leveraging both teams.

Ex. 791.

28. Zatkovich explained the significance of this: "That's the key thing indicating that Landi is still coming up to speed on this, and Mr. Rotsaert is either directly or indirectly asking for

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through. Doc. No. 348 at 43. However, Graylin was resistant, noting: "At that time, ROAM didn't know that Landi was doing anything that . . . would be relevant to what ROAM was doing [i.e., mPOS]. They were building POS, so was Valence Ingenico's R&D team. But these were suggestions that was [sic] put forth . . . - by Ingenico." *Id.*

information on those particular technologies." Doc. No. 347 12–13. He went on to explain that the three features Rotsaert readily concedes were not ready (i.e., "swipe, audio jack interface & power management") bear a direct relation to BBPOS' five key designs that had been requested by and shared with Ingenico in 2012 (i.e., (1) swipe – referring to communication formats, encryption, automatic gain control, i.e., technology necessary to read the card; (2) audio jack interface – polarity detection and correction; and (3) power management – conservation of battery-life for the devices). *Id.* at 13.

29. The innovation and importance of BBPOS' trade secrets was also recognized contemporaneously by Graylin, who testified:

> . . . there's just not too many people in the world that really understood how to not only build a mobile reader, but a mobile reader that interfaces, you know, with the new POS devices. I mean, new mobile phones to make a POS device as a totality. So that combination of talent of building not only an EMV reader, but also an EMV reader that interfaces with iOS and Android, there were few people in the world that I would say really knew how to do that.

Doc. No. 348 at 42–43.

30. It was at Graylin's instruction, as CEO of ROAM, and Rotsaert's requests, as manager of the information exchange between BBPOS and ROAM and Ingenico, that each of BBPOS' five key designs were shared with Defendants in 2012 via email, during regularly scheduled and impromptu teleconferences, and three in-person, multi-day workshops (two in Hong Kong, and one in France), as detailed further below. Doc. No. 347 at 10, 12–13, 24–25, 35–36, 39–40, 55, 61; Ex. 817 (demonstrative purposes re: *Ingenico requested and received the key designs*: ref: Slides 2–4 (polarity detection), 6–9 (power management), 11– 12 (AGC), 14–15 (comm. formats), and 17 (modified DUKPT)); Ex. 791; Ex. 821 (formerly 731); Ex. 372; Ex. 138, Ex. 143; Ex. 118; Ex. 80; Ex. 784; Ex. 821; Ex. 375; Ex. 136; Ex. 140; Ex. 407; Ex. 155; Ex. 180; Ex. 141; Doc. No. 349 at 73–74, 76, 82, 85–86, 88, 90–109, 111, 115; Ex. 406; Ex.

588; Ex. 590; Ex. 68; Ex. 72; Ex. 73; Ex. 144; Ex. 145; Ex. 146; Ex. 371; Doc. No. 351 at 89–102; *cf.* Exs. 140 and 371.

31. Over the next two or more years, Ingenico incorporated each of the five key designs in the Accused Products, before the first Accused Product hit the marketplace beginning in February 2014. Doc. No. 346 at 106; Doc. No. 347 at 14–18, 25–30, 40–45, 52–54, 56–57, 62; *cf.* Exs. 372-0005 and 208-0004; Ex. 817 (demonstrative purposes re: *Ingenico used the key designs*: ref: Slides 3–4 (polarity detection), 7–9 (power management); 12 (AGC), 15 (comm. formats), and 17 (modified DUKPT)); Ex. 193; *cf.* Exs. 118-0005 and 208-0004; Ex. 207; Ex. 192; Ex. 193; Ex. 199; Ex. 209; Ex. 217; Doc. No. 349 at 112–118; *cf.* Exs. 451A and 207; *cf.* Exs. 371 and 207; Ex. 473.

32. After extensive examination and testing, Zatkovich was able to subsequently determine or independently confirm that both the physical and non-physical aspects of each of BBPOS' five key designs were practiced in the Accused Products. That testimony went largely unrebutted. *See* Section XII, below.

33. Other than *looking* at the handful of circuitry excerpts, and pointing to the errant resistor here or capacitor there, Shamos focused the bulk of his efforts and energy at trial in trying to establish that the key designs were not entitled to trade secret protection in the first place because they were already generally known as of 2012 or readily ascertainable via circuitry "teardown." *See* Section II, above.

34. Shamos conceded that he (1) undertook no attempts to physically touch or examine any of the mPOS devices at issue in the case, (2) made no attempts to replicate, nor does he dispute, any of the results of Zatkovich's tests, (3) offered no opinions as to whether the key designs were readily ascertainable after June 30, 2012, (4) made no attempt to reverse-engineer any of the

key designs, and (5) offered no opinions as to whether the Ingenico solutions were the product of independent development or to establish that Ingenico or Landi had an awareness of the problems being addressed in these key designs at this time. Doc. No. at 98, 100–101, 103, 105.

a. Polarity Detection and Correction

35. The polarity detection and correction key design is a circuit that detects and, if necessary, automatically reverses the polarity of the audio jack automatically based on the type of audio jack port a given mobile phone or tablet uses. Doc. No. 347 at 6. Without this feature, the mPOS device would not function and the device and smartphone could be damaged. Doc. No. 349 at 69.

36. Over a period of two to three years, BBPOS (and specifically Tang, along with engineers Tsai and Derek Chan) developed a circuitry design to address this problem. Doc. No. 349 at 69. The development process included designing and testing multiple iterations of the circuitry design and development of accompanying software. *Id*. Tang testified that the BBPOS polarity detection key design is a low-cost solution that utilizes very few components. *Id.* Similar to Zatkovich and Shamos, in 2012, Tang was aware of no other mPOS devices that had a solution to polarity detection and correction.[9] *Id*. The competing product from that time period, manufactured by Square, was a *passive* device that did not have a battery, and thus BBPOS' key design was not necessary for or otherwise applicable to that type of mPOS device. *Id*. at 70; Doc. No. 351 at 108.

[9] Similarly, neither BBPOS' technical expert, Zatkovich, nor Defendants' technical expert, Shamos, respectively, were aware of or otherwise identified any other commercially available active devices that transmitted digital data via audio jack port as of 2012. Doc. No. 346 at 118; Doc. No. 347 at 6, 88; Doc. No. 353 at 101–102.

37. Tang further testified that another mPOS developer would not be able to determine the polarity detection key design simply by analyzing the product. Doc. No. 349 at 72–73. This is because the mPOS device contains hundreds of components and, without knowing what the key design was ahead of time, it would not be possible for an outside engineer to know which small portion of those components relate to polarity detection. *Id*. at 72–73. Tang testified that it would be "very unlikely" and would require "a lot of time and work" to determine the key design. *Id.*

38. Zatkovich corroborated Tang's testimony, namely, that BBPOS' polarity detection key design would not be readily ascertainable "simply by looking at or probing a circuit board" for an mPOS device. Doc. No. 347 at 17, 19. He noted that, even with him knowing "exactly what he was looking for," it still took him "about two days" to identify the same design in just the RP350x device. Doc. 347 at 17.

39. Although Shamos undertook no efforts to replicate Zatkovich's tests or otherwise independently test or review any of the assumptions Zatkovich made in rendering his opinions, Shamos claimed that BBPOS' polarity detection and correction key design, to the extent it is determined to be comprised solely of circuitry used in a commercially available device, is inherently insusceptible to trade secret protection, as a general proposition, because electrical circuitry can be subjected to a "teardown" process. Doc. No. 353 at 55–56.

40. In explaining how he identified this key design in the Accused Products, Zatkovich determined Ingenico was using (1) the "exact same design with [2] the exact same type of N channel MOSFET transistors and [3] exact same configuration of that circuit connected to the audio jack." Doc. No. 347 at 14-15; Ex. 208; *cf.* Exs. 372-0005 and 208-0004; Ex. 817 (demonstrative purposes: ref: Slide 3).

41. Zatkovich essentially disproved Shamos' "one-size-fits-all" teardown theory based on the difficulties he faced and efforts he expended in this case,[10] further testifying that "just knowing what components are in the product and how they're connected to the circuit board does not reveal in many cases the full purpose or functionality of the device, or the specific problems that the devices were used to overcome." Doc. No. 354 at 58.

42. Moreover, Shamos' testimony – that there are only "six ways of connecting the two MOSFET transistors" in BBPOS' polarity detection design, "so it's very easy to figure out what the circuit is doing" (Doc. No. 354 at 62–63; Doc. No. 353 at 57) – is simply incorrect.

43. As Zatkovich explained, the existence of three pins on each of the two MOSFET transistors gives rise to six *permutations* – not six possibilities – of ways to potentially configure the necessary connections, which equates to, at least, hundreds[11] of alternative configurations for the one precise configuration found in both BBPOS' and Ingenico's respective polarity detection circuit designs. *Id.*

[10] For example, Zatkovich estimated that, even aided by nonpublic knowledge of the claimed trade secrets and their intended functionalities, his educational and professional experience and expertise in electrical circuitry and POS devices, the additional manpower and back-end support that was provided by his hired consultants and/or contractors, and unfettered access to the inventors, proprietary IP, and test software, it nonetheless took him about thirteen full business days (in total) to determine that Ingenico had used the five key designs in the accused RP350x device (alone). Doc. No. 347 at 102–106.

[11] While noting he had not done the calculation to determine the exact number of permutations for six possible connections, Zatkovich estimated "it would be thousands." Doc. No. 354 at 62. In full candor to the Court, the exact number of permutations is actually 720, where the factorial function for six permutations may be mathematically expressed as "N! = N x (N – 1)!" *or* "6! = 6 x 5 x 4 x 3 x 2 x 1 = 720" – so a 1 in 720 chance, not 1 in 6. The Court may take judicial notice of such an adjudicative fact to the extent it is deemed to be derived through a generally known process – such as mathematics, *see* F.R.E. 201.

44. Tang also disputed the general notion that the precise connection wiring would be readily observable upon a physical inspection of an mPOS device, explaining that "there are multiple layers in a circuit board. Sometimes the wiring is hidden." Doc. No. 350 at 27.

b. Power Management / Temp Sleep and Wake-Up

45. The second key design addresses the power management of an mPOS device. Because mPOS devices contain small batteries, it is important for the device to be efficient with power consumption so that the device can last longer. Doc. No. 349 at 74.

46. Tang also explained that BBPOS' power management / temp sleep and wake-up design "is a combination of the hardware and the algorithm to detect a wake-up signal. And if we get a wake-up signal i.e., a valid mPOS signal, then we'll keep the circuitry in an awake state; and if not, we will go back to sleep." Doc. No. 349 at 74.

47. BBPOS' design is unique because it relies on "an audio signal from the phone, and if the wake-up signal is not there, the device will power down completely and in safe -- virtually, there's no power consumption." Doc. No. 349 at 74. Zatkovich similarly testified that the value of this key design "is, in intelligent fashion, save as much power as possible and not just wake up when you see activity or not just wake up when you swipe a card, but wake up specifically when the mobile phone is prepared to initiate a transaction, which is when it sends an initiation signal to the mPOS." Doc. 347 at 30.

48. Over a period of two to three years, BBPOS invented a circuitry design and software to address this problem. Doc. No. 349 at 75. The development process included designing, building, and testing multiple iterations of the circuitry design and development of accompanying software. *Id.* Again, the BBPOS solution was unique at the time because no other active mPOS devices existed in 2012. Doc. No. 349 at 70.

49. Tang further testified that it would be "very difficult" for another mPOS developer to determine the power management key design simply by analyzing the product "because BBPOS' design is a combination of the hardware, and . . . a piece of software to control the logic to keep it in the correct state." Doc. No. 349 at 75.

50. Zatkovich agreed. He noted that this key design, while reduced to "a very simple solution," is "very complex" and implicates "a complex sequence of actions," explaining further:

> For someone . . . to deduce that design simply from observation -- and, again, I was able to examine the Ingenico device because I knew in advance exactly how it worked, and then I could follow the trace. But if you didn't know this trade secret, what I'm considering a trade secret, you wouldn't understand the design of that, those particular circuits, because, again, part of the combination is the software. Having a temp wake-up circuit and a stay-awake circuit . . . in and of itself, will not reduce the function.

Doc. No. 347 at 31.

51. Shamos conceded that, at least, part of this key design is not readily ascertainable – i.e., "the part that's in software that is not decodable." Doc. 353 at 73; Doc. No. 347 at 19, 30–32, 44–46, 49–52, 57–58, 62.

c. Automatic Gain Control

52. The third key design addresses the need for automatic gain control to enhance the reliability of the transfer of digital data via audio jack port to enable mPOS transactions. Doc. No. 349 at 76–77.

53. As Tang explained:

> . . . There are so many different phones in the market, and each of the phones have different audio characteristics and what you call a "frequency response." And so some phones, if you send out a signal in high notes, high tone or -- you can get a better loudness; and some phones, you send in a low tone, you can get a better loudness. So it would distort -- different phones will distort the signal in a different manner. And there's different gain. That's why we have automatic gain control. There's gain in the phone. And, also, there's a different mic bias in the phones. So there are different audio characteristics in different phones. And we have to find

> this out so that we can use our product on different phones, as many as possible. And there are so -- so we would tune these parameters.

Doc. No. 349 at 76–77.

54. Tang further explained that, at the time, BBPOS was attempting to use the audio channel of a smartphone (traditionally intended for music and voice) in a "novel manner." Doc. No. 349 at 77. BBPOS thus needed to know the characteristics of the audio channel to be able to send the data reliably from one end to the other and to minimize the bit error rate. *Id.* The higher the error rate means the more times a customer potentially has to swipe his or her card in order to complete the desired purchase transaction, which can be sufficiently annoying to result in lost sales. *Id.* at 78, 80.

55. According to Tang, BBPOS' design is unique because it applies a proprietary algorithm to a set of uniquely defined parameters in its solution, leading to better bit error rates than its competitors. Doc. No. 349 at 79–80. Zatkovich agreed, describing the value of this key design as follows:

> . . . if you don't combine optimum data settings, in other words, if you don't try to complete the transaction as quick as possible, you introduce a longer period for errors. So the optimum settings are to minimize the amount of transmission time it takes and then the auto gain control allows you to make sure that that signal is sent in the highest quality possible.

Doc. No. 347 at 34–35. He further noted that: "without both the optimum data rate settings for each phone and the auto gain control software, you're going to get numerous errors trying to swipe the card, which of course would be terrible for your product reliability." Doc. No. 347 at 38.

56. Over a period of two to three years, BBPOS (and specifically Tang, along with engineers Tsai and Chan) developed its solution to address this problem. Doc. No. 349 at 80–81. The development process included testing approximately 400 to 500 mobile phone models to

determine optimal settings and model parameters, followed by the development of an accompanying algorithm for automatic gain control. *Id*. at 81. As Tang testified, as of 2012, there were no other known mPOS devices using this automatic gain control solution. *Id.*

57. Tang confirmed that it would not be possible for another mPOS developer to determine BBPOS' automatic gain control key design, which uses its own unique parameters to characterize the audio communication channel, by simply looking at the product, because "the parameters are in the software, and it cannot be seen from [looking at the] product." Doc. No. 349 at 81.

58. He further testified that it would be "very unlikely" for another mPOS developer to come up with BBPOS' key design independently "because BBPOS study [sic] so many phones and different phones, and BBPOS we come up with this set of parameters, and there are different ways to -- how you use the audio channel using different modulation methods. And we have our own particular modulation, frequency, data rate, and preamble formats." Doc. No. 349 at 81–82.

59. Zatkovich agreed that this key design would not be readily ascertainable:

> . . . the only way to come up with this is trial and error over a long period of time, not only just to come up with the data settings, but to determine how to deal with the drift. I'm sure there might -- there would be other ways to do that, but it would take probably a couple generations of products and several iterations to come up with an algorithm, first to understand that there is drift in the signal and different drift for different models, and then to determine an algorithm to come up with that. So that's not something that can be observed, the fact that you're correcting for the drift cannot be observed in any way, shape, or form externally.

Doc. No. 347 at 44.

60. And so did Shamos. He admitted that the testing and setting of BBPOS' optimal parameters would not be readily ascertainable and, by implication, any non-circuitry component to the trade secret (i.e., the algorithmic portion of the automatic gain control). Doc. No. 353 at 87.

(". . . so the part that was readily ascertainable is any circuitry that's involved in it . . . and the specific values of the parameters that were used in the automatic gain control for the 400 and whatever phones, that's ascertainable, but it would take a long time for somebody to ascertain them. So I'm not sure it's readily ascertainable.").

d. Communication Formats

61. The fourth key design addresses the need for an mPOS device and the smartphone to understand or otherwise "communicate" the card swipe data that has been converted into a digital form (i.e., ones and zeros) to send over an audio channel. Doc. No. 349 at 82–83. Without knowing the format, the ones and zeros would just look like "garbage." *Id.*

62. Each BBPOS customer, such as PayPal, will require particular data specifications (i.e., the specific card information it needs for its payment application software to work). Based on those specification, BBPOS (and specifically Tang, along with engineers Tsai and Chan) "defined a proprietary format that tells how BBPOS converts a track data from a magnetic strip and then use data compression, data truncation, data encryption, and how we use error detection to allow the data to be sent and to be retrieved by the other end." Doc. No. 349 at 83.

63. BBPOS has developed over twenty of its own proprietary communication formats that provide different information that may be required by its various customers. Doc. No. 349 at 83.

64. The value of this design to BBPOS is that "once its customers have used its readers, they will use BBPOS' communication format and SDK to talk to its readers. And if they want to . . . or the software wants to talk to readers from other vendors, it will be impossible. And this creates some kind of customer stickiness because if they want to use our [sic] reader, they have to change their software . . ." Doc. No. 349 at 84.

65. Switching to another mPOS vendor, would necessarily require BBPOS' customer to change its payment application software, which would require "a lot of engineer work" and cause compatibility issues, which would make the potential transition "very painful" for the customer. Doc. No. 349 at 84–85.

66. Zatkovich testified that BBPOS' communication formats, in particular, are not generally known or readily ascertainable because the manner in which BBPOS defines its customer specifications and preferences within any given communication format involves 20 to 30 distinct decision trees and is kept secret from even BBPOS' own customer, insomuch as the underlying communication format is intentionally obscured within BBPOS' SDK. Doc. No. 347 at 19, 30–32, 44–46, 49–52, 57–58, 62.

67. Shamos conceded that he thought it unlikely that BBPOS' asserted communication format IDs would be found publicly available, and had no basis to dispute that BBPOS created them. Doc. No. 353 at 116-177.

68. Shamos also conceded that any encrypted fields would not be detectible by eavesdropping on the data exchanged between the mPOS device and the phone unless you knew what encryption method was used and what key was used to encrypt it. Doc. No. 353 at 88–89, 91, 93. Zatkovich agreed that encrypted fields (as used in BBPOS' communication formats) would not be detectible, thus, rendering any portion of the format that *could* be determined useless. Every single bit (binary digit) of the communication format must be known to transmit the information in a compatible fashion. Doc. No. 354 at 55.

e. Modified Data DUKPT

69. The fifth key design addresses the need for effective encryption of cardholder data in an mPOS environment and also enhances the "customer stickiness" aspect of the four other key designs. Doc. No. 349 at 86–87.

70. As Tang explained, "in mPOS, if you send the card data unprotected to a phone, because there are so many applications running on mobile phones, it can be stolen, the card numbers and other sensitive information. So we need a way to encrypt the card data and to protect it when we transfer it to the phone and then to the -- some back end, like banks and processing networks, and so that the sensitive information is not revealed during this transfer." Doc. No. 349 at 86.

71. The modified variant of encryption used by BBPOS is no more and no less secure than the industry standard (known as Triple DES Derived Unique Key Per Transaction, or TDES DUKPT). Doc. No. 349 at 87. The value of this key design, however, is that, for each of BBPOS' communication formats requiring the modified data DUKPT (including, for example, BBPOS' Format IDs 11 and 29), if those customers were to switch mPOS vendors, they would need to change their software not only on the front end, but also on the back end, which customers are reluctant to do from a cost and efficiency standpoint. Doc. No. 349 at 87–88.

72. As Tang confirmed, it would not be possible for another mPOS vendor to determine the BBPOS modified data DUKPT encryption method from looking at the device because "when data is encrypted, it appears just like a random string of . . . ones and zeros. So it is impossible to tell what encryption algorithm is being used." Doc. No. 349 at 89.

III. BBPOS Engages with ROAM Data

73. Will Graylin met Ben Lo around 2009. Doc. No. 348 at 10. At the time, Graylin was CEO of ROAM Data, and Lo had recently founded BBPOS.

74. On May 4, 2010, ROAM and BBPOS entered into the Engineering Development and License Agreement. Ex. 1. The License Agreement reflected a partnership between two companies for the manufacture and production of certain mPOS devices, including the CircleSwipe device. *Id.* at 10. BBPOS' role in the partnership was to design, manufacture, and deliver the mPOS devices to ROAM, including the software utilized in the mPOS device.

75. The Licensing Agreement imposed certain obligations related to delivery and protection of confidential information. The relevant provisions provided as follows:

> **3. PARTNER REPRESENTATIONS, WARRANTIES, AND COVENANTS**
>
> 3.1 The Partner BBPOS shall promptly provide and deliver to the Company ROAM the Products, Devices, Services or other work product ordered or requested by the Company as Specified herein or in any SOW (collectively, the "Deliverables").
>
> **6. CONFIDENTIALITY**
>
> 6.1 Both parties agree to treat the other party's Confidential information (as defined below) as confidential, to take all reasonable measures to protect and prevent the disclosure of and/or unauthorized use by third parties of the other parties' Confidential Information, to exercise at least the same degree of care exercised for that protection of its own Confidential information, and to not use Confidential Information other than far its intended purpose under this Agreement.
>
> 6.2 "Confidential Information" shall mean information (whether written or oral) of a confidential or proprietary nature concerning this Agreement or the assets, products or business of any party hereto that either party shall have obtained as a result of discussions or communications related to this Agreement or the transactions contemplated undertaken by this Agreement, including) (but not limited to) in the case of the Company, the technical and other information; concerning the Products and Devices and related documentation. Without limiting the generality of the foregoing, the terms and conditions of this Agreement are hereby deemed Confidential Information. Also without limiting the generality of the foregoing, If either party hereto receives from the other party written Information that is marked "Confidential and/or "Proprietary", such Information shall be deemed "Confidential Information." The obligation to keep Confidential information confidential shall not apply to any information that has been disclosed in publicly available sources: is, through no fault of the party receiving the confidential Information, hereafter disclosed in a publicly available source; or is in the rightful possession of the party receiving the confidential information without an obligation of confidentiality.

> 6.3 Notwithstanding any provision herein to the contrary, a party may disclose Confidential Information on a need-to-know basis to Its contractors, lawyers, accountants and agents, provided that any such person is bound by a duty of confidentiality, and such party shall be responsible for any disclosure or use by any such third party in contravention hereof. In addition, a party may disclose Confidential Information if such party reasonably determines that such disclosure is required by law, provided that such party shall endeavor to minimize the extent of such disclosure and, if possible, provide the other party with prior notice of the disclosure so as to allow such other party to seek a protective order to prevent or limit the disclosure.

Ex. 1. The Licensing Agreement was amended on August 15, 2011. The above provisions were not changed.

76. At the time the License Agreement was entered, Ingenico was a minority shareholder in ROAM, with approximately a 40% ownership stake. Doc. No 348 at 13.

77. In 2010 and 2011, BBPOS continued to sell the CircleSwipe through the Licensing Agreement with ROAM, improve upon its products, and was preparing for the launch of next-generation EMV mPOS devices. Doc. No. 351 at 109; Doc. No. 348 at 12–13; Doc. No. 350 at 45.

78. By early 2012, Ingenico had increased its investment in ROAM and was a majority stakeholder. Doc. No. 348 at 14. Ingenico would acquire 100% of ROAM in 2015, and ROAM merged into Ingenico in 2017 (forming "Ingenico Inc."). Doc. No. 350 at 114–115.

IV. BBPOS Enters Acquisition and Joint Development Talks with ROAM Data and Ingenico

79. In early 2012, ROAM and BBPOS were in negotiations regarding a possible acquisition of BBPOS by ROAM. Doc. No. 348 at 30–31. Because the funding for the potential acquisition was to flow from Ingenico, to ROAM, and then to BBPOS, Ingenico was involved in the due diligence process. Doc. No. 348 at 88–89.

80. In 2012, Christopher Rotsaert was serving in dual roles at ROAM and Ingenico. Rotsaert testified that he became an employee of ROAM on July 1, 2012. Doc. No. 350 at 115. However, Rotsaert also testified that "if you consider that ROAM did merge with Ingenico,

Inc., where I'm currently employed, so I've kind of always been employed by ROAM Data, which became Ingenico, Inc., after the merger." *Id*. Rotsaert also had a ROAM email account several months before July 1, 2012, which he was using no later than May 2012. Ex. 830.

81. Graylin testified that Rotsaert had been "under agreement [as a ROAM employee] for months and months well ahead of time." Doc. No. 348 at 104. He also testified that Rotsaert was assigned to ROAM from Ingenico when he arrived in February 2012. Doc. No. 355 at 44. Rotsaert's role in 2012 was to act as a product manager for a next generation mPOS device known as the G4X, with BBPOS handling the hardware. Doc. No. 348 at 15. Part of Rotsaert's role was to gather data and make recommendations for Graylin, who would ultimately be responsible for decision making on the G4X. *Id*.

82. Tang was introduced to Rotsaert by Graylin, and that Rotsaert was introduced to him as "an employee of ROAM Data." Doc. No. 349 at 103. Rotsaert agreed that he was "leading the cooperation" for the joint development from the beginning. Doc. No. 350 at 142–143.

V. BBPOS, ROAM, and Ingenico Enter "Prestudy" Period for Information Sharing Pursuant to Contractual and Common Law Confidentiality Obligations

83. In February 2012, Will Graylin arranged for BBPOS to meet with Rotsaert and Ingenico engineer Patrice Fivel at BBPOS in Hong Kong. Doc. No. 350 at 143; Ex. 406. This first meeting, known as the first "Hong Kong workshop," kicked off an information sharing period that lasted from February 2012 through about July 2012. Rotsaert referred to this period of time as the "prestudy." Doc. No. 350 at 143–144. Rotsaert testified that from February 2, 2012, until the fall of 2012, he was "leading the cooperation" in terms of exchanging information between BBPOS and members of the Ingenico development team in Valence, France. Doc. No. 350 at 143.

84. This information exchange, or prestudy, among BBPOS, Ingenico, and ROAM served dual purposes. First, ROAM and Ingenico were conducting due diligence on BBPOS technology for the purposes of the potential acquisition of BBPOS by ROAM. Doc. No. 348 at 88; Doc. No. 351 at 133.[12] At the time of the potential acquisition, the ROAM board of directors contained two of the top-tanking officers at Ingenico. Doc. No. 348 at 89. Second, all parties were contemplating a joint development of the next generation mPOS product. Doc. Nos. 350 at 144;[13] Doc. No. 348 at 89; Doc. No. 351 at 113–114.

85. Lo understood that the information shared during this period was to be kept confidential. Doc. No. 351 at 110–113. Graylin also testified that part of the reason he was pushing for the acquisition of BBPOS was because "Ben and Jimmy and team had lots of competence when it comes to the interactions between mobile devices, which is iOS and Android devices, and these card readers," had been good partners to ROAM, and that there was "a level of trust there." Doc. No. 348 at 16.

86. According to Graylin, Rotsaert was coordinating the information exchange between BBPOS and Ingenico, and Rotsaert was supposed to be working for ROAM at the time of the information exchange. Doc. No. 348 at 22–23. Graylin's understanding of Section 3.1 of the Licensing Agreement was that if ROAM, including Rotsaert, requested information from BBPOS, BBPOS was required to provide it. Doc. No. 348 at 26.

87. Graylin introduced Lo to Rotsaert in early 2012 and instructed Lo to work with Rotsaert and Ingenico to develop an EMV swipe reader that would meet Ingenico's product requirements,

[12] Graylin testified that the technical information was one-way from BBPOS to ROAM with Ingenico also doing due diligence. Doc. No. 348 at 23.

[13] Rotsaert testified that "If the conclusion of the prestudy had been positive, yes, it would have been co-developments sic, Valence with BBPOS." Doc. No. 350 at 144.

permitting the contemplated devices to be sold through Ingenico's product channels. Doc. No. 351 at 109–10. Lo's understanding was that all information provided to Ingenico was protected under Section 6.3 of the Licensing Agreement. Doc. No. 351 at 112.

88. Rotsaert testified that certain information was sent directly from BBPOS to Ingenico engineers because BBPOS was hopeful that there would be a joint development project with respect to the next generation mPOS device. Doc. No. 351 at 52. Rotsaert also testified that the BBPOS key design information was only transferred to two other persons at Ingenico, Jerome Grandmenge, and Patrice Fivel—both engineers at Ingenico. Doc. No. 354 at 32–33. Fivel was present with Rotsaert at the first Hong Kong workshop. Ex. 406. When Ingenico software architect Jerome Grandemenge contacted Lo and Tang in February 2012, he specifically stated that Rotsaert had given him their contact information, citing a need for clarification of the "roam swiper encryption algorithm." Ex. 590 at 3.

89. Rotsaert was asked about confidentiality of the key designs at trial in the following exchange:

> **Q.** I know, but that's not my question. Let me state it another way. Do you remember Will Graylin telling you in February and March, April, May of 2012 that you were to keep this information confidential in the prestudy because you were in a confidential relationship?
>
> **A.** THE WITNESS: I don't remember -- sorry. I don't remember email from Will until like July, when he started to say, "Oh, you're sending information," whereas in February -- and I remember in evidence from you where Will identified the plan that we were going to have this joint development between BBPOS and Ingenico. That was the plan in February. So he knew that we were going to share information between BBPOS and Ingenico.
>
> **Q.** Right. And when he -- when he told you about the sharing plan between BBPOS and Ingenico, he told you that this information was to be kept confidential because, one, there was acquisition discussions going on; and, two, that this information was proprietary, and you were not to share it

> with Landi or anyone else? Didn't he tell you that?
>
> MR. TECHENTIN: Objection, Your Honor. There's no foundation for this question whatsoever.
>
> MR. GRIFFIN: There's a whole case of foundation.
>
> THE COURT: Well, so there's a question as to whether he was told this. He may not have been told this. The answer may be No. The answer may be yes. I don't see where there's a foundation problem. The question is, yes or no, were you told this?
>
> THE WITNESS: So I disagree. I mean, we -- I did not get a specific message from Will Graylin saying that this prestudy should have very strong confidentiality management. Absolutely not.

Doc. No. 354 at 37–38.

90. Rotsaert testified at trial there were no disclosures to Landi (or other third parties) of any BBPOS intellectual property that was obtained in the prestudy period. Doc. No. 354 at 31. His testimony was that Landi is an original design manufacturer, or ODM, and developed the products internally. *See* Doc. No. 354 at 9–13.

91. Graylin was recalled by BBPOS to rebut Rotsaert's testimony on confidentiality. The exchange with Graylin was as follows:

> **Q.** Mr. Graylin, during the prestudy period, did you ever have any conversations with Mr. Rotsaert about the confidential nature of BBPOS' proprietary information, and if so, what were those discussions?
>
> **A.** So I recall having discussions with Mr. Rotsaert because he was assigned to us from Ingenico. And so starting when he arrived around February time frame, he was assigned to us because he had expertise in building point of sale.
>
> I've had discussions with him in the fact that we are working on a project with BBPOS. BBPOS is, obviously, sharing confidential information with us. We need to keep those confidential, as well.

I further had discussions with him and there's -- there's a -- there's discussions, I would say, prior to him even coming, that he was effectively going to be an agent to Ingenico, representing Ingenico, and then eventually I was going to pay half of his salary. So he spent half his time working with us on the G4X product, and then the other half of the time, he was working with Mr. Coonen as part of, you know, their strategy on product.

So those discussions were very clear, even before he came; and, of course, during his stay with us, you know, from February onwards, you know, we had numerous strategy and product discussions where, you know, the things were expected to be kept confidential.

Defendants' objection and motion to strike overruled

BY MR. GRIFFIN:

Q. You know what? Then the -- the narrowness of the question is: Did you have conversations with Mr. Rotsaert about the confidential nature of the proprietary information of the BBPOS tech? There's the question.

A. Yes.

Q. And did he ever say, "I don't understand what you're saying" –

A. No.

Q. -- Mr. Rotsaert? Did he ever dispute that?

A. No.

Q. Did he ever write you any emails or anything along those lines demonstrating that he had no personal knowledge or understanding that any of this information of the prestudy was confidential?

A. No.

Day 10 Trial Tr., Doc. No. 355 at 45–46.

92. At trial, Graylin confirmed that Rotsaert and ROAM data misappropriated the BBPOS trade secrets. Doc. No. 348 at 75.

93. By March 28, 2012, BBPOS and ROAM had signed a Summary of Terms of Acquisition of BBPOS. Ex. 75. The signed version was the sixteenth draft of the agreement that had been exchanged. *Id.*; Doc. No. 348 at 115. The non-binding Summary Terms contemplated a purchase of BBPOS that included a $1.65M cash payment, employment for Lo and Tang, stock options, and additional cash if certain milestones were met. *Id*. The Summary Terms also included a non-disclosure provision. *Id*.

VI. Summary of BBPOS Data Transfers to Rotsaert, ROAM, Ingenico

94. At the requests of Will Graylin (ROAM's CEO) and Christopher Rotsaert as an employee of Ingenico and ROAM, BBPOS shared each of its five key designs with Defendants. *See, e.g.*, Doc. No. 350 at 38–39; Doc. No. 355 at 45–46.

95. This transfer of information took place via multiple email communications, regularly scheduled and impromptu teleconferences, and, at least, three in-person workshops (two in Hong Kong, and one in France). Doc. No. 347 at 10, 12–13, 24–25, 35–36, 39–40, 55, 61; Ex. 817 (demonstrative purposes); Ex. 791; Ex. 372; Ex. 138, Ex. 143; Ex. 118; Ex. 80; Ex. 784. *See also* Doc. No. 349 at 73–74, 76, 82, 85–86, 88, 90–109, 111, 115; Ex. 406; Ex. 588; Ex. 590; Ex. 68; Ex. 72; Ex. 73; Ex. 144; Ex. 145; Ex. 146; Ex. 371.

96. The first workshop took place at BBPOS in Hong Kong in February 2012 and was attended by Rotsaert, Ingenico engineer Patrice Fivel, Jimmy Tang, and Daniel Tsai. Doc. No 349 at 91., Ex. 406. It lasted for two days, and BBPOS disclosed all five key designs at the workshop. Doc. No. 349 at 92.

97. A second workshop took place in April 2012, attend by Jimmy Tang, Daniel Tsai, and Ingenico engineer Jerome Grandmenge. Doc. No. 349 at 97. Again, all five key designs were discussed,

but an emphasis was placed on key designs relating to communication formats and BBPOS encryption. Doc. No. 349 at 98.

98. A third workshop took place in Valence, France in July 2012. Doc. No. 349 at 100. It was attended by BBPOS engineers Daniel Tsai and Derek Chan. *Id*. Tang helped Tsai and Chan prepare for the workshop by proving the latest designs for data communication formats and updated swiper API documents, relating to communication formats and BBPOS encryption. *Id*.

VII. BBPOS Rejects Acquisition

99. On June 8, 2012, Lo sent an email to Graylin stating that BBPOS had recently received a large order from Lakala, which changed the value of BBPOS. Lo indicated that he was no longer interested in the acquisition. Ex. 122. The same day, Graylin notified ROAM Board members and Ingenico executives Christopher Coonen and Philippe Lazare of BBPOS' change in position and expressed frustration with Ingenico's failure to have closed the BBPOS acquisition earlier. Ex. 122.

100. Shortly thereafter, Ingenico CEO Philippe Lazare flew to Hong Kong to meet with Lo. Lo testified that this meeting lasted about five minutes, and that Lazare delivered a message to Lo: "You have the terms. You have the term sheet. Either sign the term sheet as is with no changing of any clause in the term sheet, or I'm going to kill your company." Doc. No. 351 at 136.

101. Although Graylin attempted to revive the acquisition by urging Ingenico to propose new terms that may be acceptable to BBPOS. He drafted a memorandum to Ingenico on July 5, 2012, summarizing the importance of BBPOS to ROAM and Ingenico, noting that that "BBPOS has the foremost experts in the world when it comes to mobile phones and interface via the audio jack." Ex. 149. Ultimately, the acquisition did not occur.

VIII. Graylin Accuses Rotsaert of Improper Transfer of ROAM and BBPOS IP for Purpose of Ingenico Building a Competing EMV mPOS Device and gets Terminated

102. By August 2012, it was becoming apparent to Graylin that the acquisition of BBPOS would not occur. However, Graylin was continuing to push to put a development agreement in place for the next generation mPOS device. Ex. 175, Doc. No. 348 at 61.

103. On August 29, 2012, Graylin emailed Rotsaert, stating "Ben Lo told me that you had him provide you and your Ingenico colleague with various design files of the G3X and G4X reader and various source code while you were in Hong Kong in July. Can you let me know what files you received and forward them to me and our engineering department heads John Chiu and Stone so we can put it in the right place insource control? This is ROAM's IP and we need to have access to this data." Ex. 175. Rotsaert responded on August 29, 2012, attaching all files he received from BBPOS and forwarded to other Ingenico engineers for development. *Id*. Rotsaert added, "For documents about protocol, it has been limited to Q&A session on the board between Daniel/Jimmy & ingenico people as BBPOS has few documents formalizing the information." *Id*.

104. On August 30, 2012, Graylin responded to Rotsaert, writing:

> Regarding your transferring the G4X/EMV reader technology and knowledge to the Ingenico engineering team to build the EMV reader without agreement, does Christopher Coonen know you are doing this? As you know, ROAM is still an independent organization with minority shareholders and we board members have a duty to protect all shareholders and not transfer value out of the company for the interest of one group over the other, this is unlawful.

Ex. 175.

105. Rotsaert responded on September 16, 2012, writing in part:

> G4X/EMV reader technology: I'm more than surprised by your statement as we had multiple discussions (with the attached email as a clear demonstration) on this topic about the opportunity to leverage Roam technology to accelerate the development by Ingenico of the iTMP. Before the workshop in Hong-Kong, the strategy about the EMV swiper has been shared with you …

> As Roam has been using BBPOS as a design house for swiper. we are leveraging ingenico internal development capacity to develop this EMV product **This approach will be profitable to Roam to the extend [sic] that Roam will benefit from ingenico's design capacity & technology. In order to proceed to such development exercise we obviously have to feed ingenico with information which do not amount to a transfer of technology**. This Group approach may result in significant development cost saving, reliability of development path. As discussed with Christopher Coonen, this integration of Roam Data's solution into this EMV product was designed to give Roam access to a wider market thereby granting Roam a higher return on its intellectual property. We would thereby increase value of the company and taking into account the interest of all the shareholders including minority shareholder.

Ex. 175 (emphasis supplied).

106. Rotsaert forwarded his response to Coonen on September 16, 2012. Ex. 174. Coonen replied, "you're defending yourself well, but please don't answer with email. We'll discuss this week." Ex. 174; Doc. No. 351 at 34.

107. Graylin's response came on September 17, 2012:

> Christopher,
>
> Just because you sent me an email to me, does not mean you have my agreement and my permission to start transferring IP that does not belong to Ingenico. Your assumption that the reader IP belongs to ROAM was already incorrect, then to further transfer them further to Ingenico without my explicit permission and without any commercial agreement in place was a real mistake. Apparently you are still not comprehending the gravity of the situation. Your actions and assumptions are threatening the very fabric of ROAM's relationship with its most important supplier. You are transferring value from one company to another company unilaterally without agreement or consideration. There is an apparent lack of respect for the IP or BBPOS and ROAM, and for my role as CEO of ROAM.
>
> Regarding your performance in working with the team, we need to discuss in person. Clearly we have different expectations of your role.

Ex. 175.

108. Graylin also raised his concerns regarding Rotsaert's transfer of intellectual property directly to Lazare and Coonen, writing in a letter dated September 3, 2012 that Rotasert "transferred key technology and design information of ROAM's reader to Ingenico R&D team

in France without any commercial agreement in place that allows him to do so. He also pushed Ingenico to develop a new EMV reader product that competes with ROAM's reader using the same technology and trade secrets." Ex. 168. At the time, ROAM's mPOS reader was the same as BBPOS', as the two companies were still operating under the 2010 Licensing Agreement.

109. Graylin reiterated his concerns in an email to Lazare and Coonen on September 15, 2012, identifying the transfer of ROAM intellectual property to Ingenico and Ingenico's interference with ROAM's "critical" relationship with BBPOS as topics for discussion at the upcoming board meeting. Ex. 172.

110. At the ROAM board meeting in late September 2012, Graylin was terminated from his role as CEO of ROAM. Doc. No. 348 at 63.

111. After Graylin's termination, ROAM and Ingenico entered into a development agreement for the RP350x with Fujian Landi Commercial Equipment Co. Ltd ("Landi"), dated October 29, 2012. Ex. 214.

112. In late 2012, Graylin called Lo to inform him that he had been terminated, and to give him a "heads-up" that he suspected there was "some intention" for Ingenico to build a competing product to the G4X. Doc. No. 348 at 64–65. Graylin testified that he had no knowledge of the Landi development agreement, or about the RP350X at the time he called Lo. Doc. No. 348 at 65. Graylin characterized his thoughts about the competing product as "speculation." Doc. No. 348 at 66.

113. A prototype of the RP350X first appeared at a Cartes tradeshow in Paris, France, in November of 2012. Doc. No. 350 at 127. Rotsaert testified that the prototype was really a "3-D printed casing" rather than a finished product. Doc. No. 351 at 77. Rotsaert's testimony

regarding the intellectual property inside of the prototype was inconsistent. At one point he testified that the prototype was an existing Landi product it had been working on with the display and keypad removed, placed inside of the casing. Doc. No. 351 at 78. At another point Rotsaert stated that BBPOS intellectual property was in the prototype displayed at Cartes in 2012, but that the intellectual property was used "for only the prototype." Doc. No 351 at 69.

114. The RP350X continued to be developed from December 2012 until 2014, when it became available for commercial use and sale. Doc. No. 350 at 130–31.

IX. Lo Seeks Assurances that ROAM and Ingenico's Competing Product Does not use BBPOS Intellectual Property

115. Lo did not see the prototype RP350X in 2012 but did learn that ROAM and Ingenico were developing a competing mPOS product in late 2012 or early 2013. In January 2013, Lo called ROAM's COO, Bill Bachrach, and sought confirmation that the new competing product was not utilizing BBPOS intellectual property. Doc. No. 351 at 127.

116. In response, Lo received an email from ROAM's new CEO, Ken Paull dated January 19, 2013. Ex. 200. Paull wrote in relevant part:

> Hi Ben - sorry I missed seeing you if you were in the U.S. recently.
>
> I heard from Bill that you were upset about hearing that there is an Ingenico EMV prototype that we are showing. confused as you and I spoke about this, our need to move to a dual supply chain as we move to handle demand from around the world and even the possibility of ROAM licensing BBPOS software for potentially a unified SDK/API that would support both product lines. **I can assure you that there is no commonality in terms of architecture, firmware or power with the Ingenico device as it is based off of an existing Landi product.**

Ex. 200 (emphasis supplied).

117. An internal document from Landi dated May 2013 demonstrated that the RP350x was still undergoing development and was not ready for commercial sale. Ex. 219; Doc. No. 350 at

134. Rotsaert confirmed that he did not share any development information regarding the RP350x with Lo. Doc. No. 350 at 134.

118. Sales records produced by Ingenico demonstrate that the first accused product to be sold, the RP750x, was shipped on February 4, 2014. Doc. No. 350 at 118, 129; Ex. 473. The next accused product to be sold, the RP350X, was first shipped in July 2014. *Id*.

X. Lo Discovers the RP350X and BBPOS Engineers Find Their Key Designs in the RP350X But is Unable to Act Immediately

119. Lo first saw the RP350X at a tradeshow in Paris in late 2014. Doc. No. 351 at 128. He suspected that the device contained BBPOS intellectual property but did not have the ability to act immediately. Doc. No. 351 at 128–29. BBPOS engineers were able to buy an RP350X device off of eBay in 2015. Doc. No 351 at 129. BBPOS engineers were able to find BBPOS key designs in the RP350X. Doc. No. 352 at 6. BBPOS would later retain an expert witness, Ivan Zatkovich, who, after discussions with BBPOS and analysis of the product, identified five BBPOS key designs in the accused product. Doc. No. 352 at 6.

120. At the time Lo discovered the RP350X, BBPOS was in "survival mode," having low purchase orders from ROAM for the BBPOS next generation product, and losing its largest customer in China, Lakala, to Landi. Doc. No. 352 at 6. Landi also stopped placing orders with BBPOS in 2014. Doc. No. 352 at 6.

121. Lo raised about $1.5M in 2014 from friends and family to ensure that he could make payroll for his employees. Doc. No. 352 at 7. In 2015, he took a mortgage on his only property and signed a personal guarantee to get a loan from an investment banker, both to support BBPOS. Doc. No. 352 at 8. Lo testified that his "only job" in 2015 was to focus on fundraising. Doc. No. 352 at 8. He spent his time preparing business plans and PowerPoint presentations, and he flew around the world meeting potential investors. Doc. No. 352 at 8. Lo found an investor

in Taiwan, but the terms of the investment were onerous, and BBPOS continued to struggle until the end of 2017. Doc. No. 352 at 8. Lo testified that in this time period, BBPOS did not make a profit. Doc. No. 352 at 8.

122. In 2018, Lo flew to the United States to meet a financial advisor, JT Dominick, to seek financial guidance. Doc. No. 352 at 8–9. After hearing Lo's story about Ingenico, Dominick suggested that Lo file a lawsuit against Ingenico. Doc. No. 352 at 9. Lo was skeptical because he did not have the financial ability to bring a lawsuit. Doc. No. 352 at 9. Dominick explained that in the United States, alternative financing options are available for certain lawsuits and suggested that Lo meet with an attorney. Doc. No. 352 at 9.

123. Lo met with an attorney in 2018, and, after a period of due diligence, BBPOS filed suit on December 20, 2018. Doc. No. 352 at 9; Doc. No. 1.

XI. Rotsaert, ROAM, and Ingenico Requested and BBPOS Shared All Five Key Designs in the Accused Products

124. Rotsaert, ROAM, and Ingenico (either through Rotsaert or a small control group at Ingenico who had access to BBPOS through Rotsaert) specifically requested and received access to each of BBPOS' five key designs. Doc. No. 347 at 10, 12–13, 24–25, 35–36, 39–40, 55, 61; Ex. 817 (demonstrative purposes); Ex. 791; Ex. 821 (formerly 731); Ex. 372; Ex. 138, Ex. 143; Ex. 118; Ex. 80; Ex. 784; Ex. 821; Ex. 375; Ex. 136; Ex. 140; Ex. 407; Ex. 155; Ex. 180; Ex. 141; Doc. No. 349 at 73–74, 76, 82, 85–86, 88, 90–109, 111, 115; Ex. 406; Ex. 588; Ex. 590; Ex. 68; Ex. 72; Ex. 73; Ex. 144; Ex. 145; Ex. 146; Ex. 371; Doc. No. 351 at 89–102; *cf.* Exs. 140 and 371.

125. The exchange of information relative to BBPOS' five key designs spanned the period of February 2012 through approximately September 2012 and occurred via email

communications, phone calls, and, at least, three in-person workshops (with workshop handouts and whiteboard demonstrations). *Id.*

126. For example, BBPOS' polarity detection and correction design was specifically requested by Rotsaert and then provided to Ingenico on multiple occasions and via various means. *See e.g.*, Doc. No. 347 at 10, 12–13; Ex. 817 (demonstrative purposes); Ex. 791; Ex. 372; Ex. 138, Ex. 143; Doc. No. 349 at 73–74, 88, 90–93, 96-98, 102–103; Ex. 406; Ex. 588; Doc. No. 351 at 89–102.

127. During the first February 2012 workshop, for instance, Tang testified that BBPOS presented information about the audio jack technology in general, and then for audio jack polarity detection and correction trade secret, BBPOS used diagrams, drawing on papers and whiteboards to explain the concept behind the design and describe the problem being solved. Doc. No. 349 at 92–93. BBPOS specifically shared with Ingenico the problem that BBPOS encountered in its product design, that there are multiple configurations possible in audio jack and its solutions, the circuit diagram, and the circuitry that it used to solve this problem. *Id.*

128. BBPOS' power management / temp sleep and wake-up design was specifically requested by Rotsaert and then provided to Ingenico on multiple occasions and via various means. Doc. No. 347 at 24–25; Ex. 817 (demonstrative purposes); Ex. 791; Ex. 821 (formerly 731); Ex. 372; Ex. 136; Ex. 141; Ex. 143; Ex. 118; Doc. No. 349 at 73–74, 90–94, 98; Ex. 406; Ex. 588; Doc. No. 351 at 89–102.

129. Similar to its disclosures of polarity detection design, during the February 2012 workshop, among other instances, BBPOS shared it power management design with Ingenico, including the schematics, flow chart diagrams, and the algorithms of "how to detect a switch-on and . .

. when do you switch on again or go to sleep again, depending on what you detect in the incoming signals." Doc. No. 349 at 73–74, 93–94, 98.

130. BBPOS' third automatic gain control design was specifically requested by Rotsaert and then provided to Ingenico on multiple occasions and via various means. *See e.g.*, Doc. No. 347 at 35–37; Ex. 817 (demonstrative purposes); Ex. 791; Ex. 80; Ex. 784; Ex. 375; Ex. 141; Doc. No. 349 at 82, 90–103; Ex. 406; Ex. 588; Doc. No. 351 at 89–102.

131. Tang testified at length that, among other things, BBPOS' proprietary algorithm for automatic gain control was taught to Ingenico during the February and April workshops. Doc. No. 349 at 90-103.

132. BBPOS' fourth communication format and fifth modified data DUKPT designs were specifically requested by Mr. Rotsaert and then provided to Ingenico on multiple occasions and via various means. *See e.g.*, Doc. No. 347 at 39–40, 55, 61; Ex. 817 (demonstrative purposes); Ex. 791; Ex. 80; Ex. 784; Ex. 375; Ex. 141; Doc. No. 349 at 82, 90–92, 95-112; Ex. 406; Ex. 588; Ex. 68; Ex. 72; Ex. 73; Ex. 144; Ex. 145; Ex. 146; Ex. 371; Doc. No. 351 at 89–102; *cf.* Exs. 140 and 371.

133. Zatkovich determined that BBPOS' proprietary communication formats were requested by and supplied to Ingenico as summarized on Slide 14 of Ex. 817, further testifying:

> I actually found probably 18 or 20 different examples of Ingenico requesting and/or BBPOS providing different formats to Ingenico. And this -- this is just a sample of the 18 or 20 communications that I found. All told, it represents at least 13 communication formats out of the 25. Of particular interest is that, in July, Mr. Rotsaert actually sends a request to Mr. Ben Lo requesting that BBPOS propose a communication format for the German market to be used by a German client. So in addition to Ingenico requesting specific formats to BBPOS, they're asking BBPOS to actually design communication formats for a market that Ingenico wants to get into.

Doc. No. 347 at 55.

134. Zatkovich likewise determined that BBPOS' modified data DUKPT design was requested by and supplied to Ingenico as referenced on Slide 17 of Ex. 817, which, for example, including Tang's provision of BBPOS' source code for Data DUKPT to Ingenico as requested by Rotsaert via email. Ex. 407. (containing entire trade secret on BBPOS encryption, and communication format 10).

XII. Ingenico Used Each of the Five Key Designs in the Accused Products

135. Ingenico used each of the five key designs in the Accused Products and deemed them to be "Must-Have" or highly desirable features, according to their own internal product / key management requirements documents. Doc. No. 346 at 106; Doc. No. 347 at 14–18, 25–30, 40–45, 52–54, 56–57, 62; *cf.* Exs. 372 and 208; Ex. 817 (demonstrative purposes); Ex. 193; *cf.* Exs. 118 and 208; Ex. 207; Ex. 192; Ex. 193; Ex. 199; Ex. 209; Ex. 217; Doc. No. 349 at 112–118; *cf.* Exs. 451A and 207; *cf.* Exs. 371 and 207.

136. There was no evidence adduced at trial that ROAM / Ingenico's usage of BBPOS' five key designs in the accused products was the product of independent development or lawful reverse-engineering – and Defendants' technical expert, Shamos, undertook no attempts to analyze the accused products or offer any opinions on these potential topics. Doc. No. 353 at 98-107.

a. Polarity Detection and Correction

137. Zatkovich testified that, by 2012, BBPOS had developed multiple iterations[14] of its key design for audio jack polarity detection and correction, including the three BBPOS designs on Slide 1 of Ex. 817 labeled "First Design" (Ex. 143), "Second Design" (Ex. 138), and "Third

[14] For example, Zatkovich testified that BBPOS' early iterations of its polarity detection design went from having nine to ten components down to just two (i.e., (2) N channel MOSFET transistors), costing approximately two to three cents. Doc. No. 349 at 17.

Design" (Ex. 372). Doc. No. 347 at 14-15; Ex. 143-0001; Ex. 138-0001; Ex. 372-0005; Ex. 817 (demonstrative purposes: ref: Slides 1–3). *See also* Doc. No. 351 at 90–93.

138. BBPOS' "Third Design" for its polarity detection and correction solution shows a specific configuration and means of connecting two N channel MOSFET transistors, appearing on the fifth page of BBPOS' "Drawing EMVSwiper" Ex. 372 in the lower righthand portion of the schematic.[15] Doc. No. 347 at 14-15; Ex. 372-0005; Ex. 817 (demonstrative purposes: ref: Slides 1–3); Doc. No. 351 at 92–93.

139. In comparing BBPOS' "Third Design" and Ingenico's audio jack polarity solution, as depicted in Landi's RP350x drawings Ex. 208, Zatkovich testified that Ingenico was using (1) the "exact same design with [2] the exact same type of N channel MOSFET transistors and [3] exact same configuration of that circuit connected to the audio jack." Doc. No. 347 at 14-15; Ex. 208; *cf.* Exs. 372-0005 and 208-0004; Ex. 817 (demonstrative purposes: ref: Slide 3).

140. Zatkovich also undertook an extensive physical and electronic inspection, examination, and analysis of the Accused Products. Doc. No. 347 at 102–106. He broke open the Ingenico devices open to better examine, probe, and understand the physical polarity detection and correction circuit and other key designs used in each of Ingenico's RP350x, RP750x, RP457c, and RP170c and came to unrebutted conclusion that Ingenico was using BBPOS' "latest and most efficient" (or BBPOS' "Third Design") for polarity detection and correction in each of the Accused Products. Doc. No. 347 at 16–18; Ex. 817 (ref. Slide 4 with "fair and accurate depictions" of the pictures he took in examining each accused product's physical circuit boards).

[15] This falls roughly within the x-axis (2-1) and y-axis (B-A) quadrant of Ex. 372-0005. Doc. No. 351 at 92–93.

141. Shamos' primary rebuttal to Mr. Zatkovich's three-part analysis, concluding that the two circuit diagrams shown on Slide 3 of Ex. 817 were "essentially the same when you compare the two circuits' respective active components," was addressing testimony Zatkovich never offered. Doc. No. 354 at 61. Contrary to Shamos' comments, the record reflects Zatkovich did not offer the opinion that the non-active components (i.e., the resistors and capacitors) in the two circuit diagrams "don't mean anything" or have no "function in these circuit." *Id.*

142. To the contrary, Zatkovich testified (multiple times) that the resistors and capacitors in his two side-by-side comparisons of the parties' respective polarity detection and correction and power management / temp sleep and wake-up circuitry contributed no functionality to BBPOS' polarity detection and power management / temp sleep and wake-up key designs and, therefore, were immaterial to his determinations that Ingenico, in fact, used BBPOS' key designs in the Accused Products.[16]

143. This distinction, however, was immediately elucidated by the Court during Shamos' direct examination via an interjected question, directly asking Shamos whether he had just said that the resistors and capacitors "have a function *in the polarity detection*, or . . . have a function *in the circuit*"; and his confirmatory response that: "It has a function *in the circuit*." *Id.* (emphasis added).

[16] For example, Zatkovich prebutted on direct examination, in part, Shamos' anticipated rebuttal during his side-by-side comparison discussion of the two BBPOS and Ingenico polarity detection circuit diagrams *cf.* Exs. 372-0005 and 208-0004 on Slide 3 of Ex. 817, commenting that "those resistors and capacitors appearing in the BBPOS design are not part of the function of *the audio jack polarity circuit.*" *See, e.g.*, Doc. No. 347 at 16 (emphasis added). Zatkovich similarly prebutted Shamos' anticipated same or similar rebuttal opinions relative to BBPOS' asserted power management trade secret, which was limited to only the portion of Zatkovich's circuitry comparison of BBPOS' and Ingenico's power management / temp sleep and wake-up designs *cf.* Exs. 118-0005 and 208-0004 on Slide 8 of Ex. 817. *See e.g.*, Doc. No. 347 at 28–29.

144. Thus, it seems that both parties' experts agree or otherwise do not dispute that the resistors and capacitors reflected in the BBPOS circuit diagrams contribute no functionality to either BBPOS' polarity detection and correction or power management solutions. *Id.*

145. The only other discernible basis Shamos gave for concluding that the BBPOS design and Landi RP350x design featured on Slide 3 of Ex. 817 were "different circuits," despite admittedly "performing the same function," appeared to be based off his present impression at trial in reviewing the BBPOS circuit schematic striking him as "strange" in that it purportedly "doesn't connect to anything" such that the "signals never leave the circuit." Doc. No. 353 at 60–64; Ex. 817 (demonstrative purposes: ref: Slide 3) (*cf.* Exs. 372-0005 and 208-0004).

146. When Zatkovich was asked about Shamos' testimony that the BBPOS circuit purportedly "doesn't connect to anything," Zatkovich testified this "certainly could not be true, otherwise the circuit would not function." Doc. No. 354 at 46–47. Zatkovich suggested that Shamos may be unfamiliar with the several decades-long convention used in the drafting, reading, and understanding electrical circuit diagrams whereby a shorthand notification is indicated in the diagram in lieu of drawing a bunch of actual lines connecting one end of a circuit diagram to the next (again, the absence of which, Shamos remarked was so "strange" at trial). *Id.*

b. Power Management / Temp Sleep and Wake-Up

147. Zatkovich testified that, by 2012, BBPOS had developed multiple iterations of its key design for power management, including the two BBPOS designs on Slides 5 and 6 of Ex. 817, respectively labeled "First Design," "Second Design," and "Third Design" (Exs. 143, 372, and 118). Doc. No. 347 at 20; Ex. 143-0003; Ex. 118-0005; Ex. 372-0005; Ex. 817 (demonstrative purposes: ref: Slides 5–6).

148. He noted that this key design, while reduced to "a very simple solution," is "very complex" and implicates "a complex sequence of actions," explaining further:

> For someone . . . to deduce that design simply from observation -- and, again, I was able to examine the Ingenico device because I knew in advance exactly how it worked, and then I could follow the trace. But if you didn't know this trade secret, what I'm considering a trade secret, you wouldn't understand the design of that, those particular circuits, because, again, part of the combination is the software. Having a temp wake-up circuit and a stay-awake circuit . . . in and of itself, will not reduce the function.

Doc. No. 347 at 31.

149. Before launching into a description of the functionality of BBPOS' "Third Design" (Ex. 118-0005), Zatkovich testified as to the portion of the diagram that he did not consider to be part of the accused trade secret, noting that the shaded out or dotted blue boxes appearing in his excerpts of BBPOS' "Third Design" as depicted in Slides 5 and 8 of Ex. 817 is actually "a separate circuit" that is "not part of the power management circuit for this particular trade secret," instead it is the circuit for the feature BBPOS calls power generation or regeneration, which "harvests the power from these audio jack signals and uses that to recharge the battery." Doc. No. 347 at 20. He noted that this circuit is not part of the accused temp sleep and wake-up design and "has no function related to the wake-up circuit." Doc. No. 347 at 20.

150. Zatkovich then used BBPOS' "Third Design" (Ex. 118) for power management to walk through how BBPOS' key design works. Doc. No. 347 at 20–21; Ex. 143-0001; Ex. 118-0005; Ex. 372-0005; Ex. 817 (demonstrative purposes: ref: Slides 5–6).

151. Zatkovich testified that this circuit diagram shows an audio jack connection on the left and how it connects to the wake-up transistor on the right, so that when there is any activity on the audio jack, it sends that signal to the wake-up transistor causing the microprocessor to wake up. *Id.* The only circuit having any activity is the audio jack connected to that transistor. *Id.* The transistor opens up and wakes up the microprocessor, causing it to then activate a second

stay-awake transistor further below, which keeps the microprocessor on long enough to analyze the audio signals. *Id.* The software in the microprocessor then analyzes the audio signals to see if it is a valid mPOS signal, or if it is noise or music, for example. *Id.* If it determines that it is something other than a valid mPOS signal, it immediately goes back to sleep within a couple milliseconds. *Id.* From a functional standpoint, this design "basically preserves the power and only wakes up the mPOS when the phone sends an initiation traction to the device, not, for example, other options that you could use." *Id.*

152. Zatkovich determined that Ingenico used this key design in its Accused Products based, in part, on Ingenico's own internal product requirements documents for the Accused Products, designating this power management feature as a "Must-Have." Doc. No. 347 at 26; Ex. 193-0020; Ex. 209-0025; Ex. 817 (demonstrative purposes: ref: Slide 7). By way of exemplar, Zatkovich depicts excerpts of the product requirements documents for RP150x and RP750x (Exs. 193 and 209) on Slide 7 of Ex. 817, both of which, specifically, requiring power consumption reduction via connection to audio jack and / or as indicated by an observation of an idle screen when the device is powered on or woken up out of a transaction operation. *Id.*

153. Zatkovich also undertook a hardware comparison of BBPOS' "Third Design" (Ex. 118), being BBPOS' "most efficient version of the power-management circuit," and Ingenico's power management solution, as depicted in Landi's RP350x drawings (Ex. 208), in determining that Ingenico used this key design by comparing the key aspects that provide BBPOS' automatic wake-up and sleep functionality, namely (1) the connection of the audio jack to a wake-up transistor and (2) the connection of the microprocessor to a stay-awake transistor from the hardware side. Doc. No. 347 at 28; Ex. 118; Ex. 208; *cf.* Exs. 118-0005 and 208-0004; Ex. 817 (demonstrative purposes: ref: Slide 8). Zatkovich went on to explain:

"And we see on the right-hand side the first arrow pointing to the . . . input from the speaker. We see that as directly connected to their version of a temp wake-up transistor. And on the right, we see that the microprocessor is connected directly to their version of the stay-awake transistor." *Id.*

154. Based on his examinations, as discussed above, Zatkovich was able to determine that "aside from a couple of resistors and capacitors which do not change the function of the circuit at all, Ingenico used the identical design that BBPOS did for their circuits." Doc. No. 347 at 28–29.

155. Finally, Zatkovich undertook a software comparison of the BBPOS and Ingenico designs, which he considers the third part of this key design, "because, again, the trick is not just waking up when you see activity on the audio jack. You have to make sure that it's woken up for a valid reason . . ." Doc. No. 347 at 29.

156. To that end, he "performed, essentially, the exact same test that he performed on the BBPOS devices" to determine whether the software in the BBPOS device behaved in the same manner as the software in the Accused Products. Doc. No. 347 at 29–30. Specifically, he observed the following identic behaviors: any activity on the audio jack woke up the microprocessor for a temporary period of time. When the microprocessor came on, it turned on the second stay-awake transistor, then it clearly analyzed the signal coming into the audio jack and only stayed awake if it had a valid mPOS initiation signal, but went back to sleep if I was sending it noise or music or voice." *Id.*

157. Again, Shamos took the position that the circuitry was not the same because of the presence of passive components, like resistors and capacitors, *see e.g.*, Doc. No. 347 at 28–29, but also due to BBPOS' overlaid power generation or regeneration circuitry or functionality that

Zatkovich specifically (and repeatedly) took pains to exclude from the purview of this claimed trade secret. *Cf.* Exs. 118-0005 and 208-0004 on Slide 8 of Ex. 817.

c. Automatic Gain Control

158. Zatkovich described this key design as having two distinct parts, namely, (1) the parameters used to set optimum transfer rate between the mobile phone and the mPOS device; and (2) the automatic gain control algorithm necessary for those optimum settings to be utilized. Doc. No. 347 at 40, 43; Ex. 817 (demonstrative purposes: ref: Slides 10, 12).

159. In concluding that Ingenico used this key design in the Accused Products, Zatkovich's first step was to identify the specific optimal settings used by BBPOS. Doc. No. 347 at 40. He determined that BBPOS used the following parameters: (1) data rates or speed setting for both the incoming and outgoing transfers, because they could be different; (2) the preferred volume setting of sending a data transmission to prevent the data signals from peaking out or being too low; (3) the size of the data objects being sent so as to minimize drifting of the signal; and (4) identifying the correct audio source for data transmission. Doc. No. 347 at 41.

160. The second step was to determine what settings Ingenico was using to perform automatic gain control. Doc. No. 347 at 41. By analyzing and de-compiling Ingenico's SDK, Zatkovich was able to find that Ingenico's accused devices were using those same settings, and, in particular, found its use of the last two settings "highly coincidental." *Id.*

161. After his analysis, Zatkovich was able to deduce (having not been provided access to Ingenico's software) that Ingenico did, in fact, use this design based on the fact that "these optimum settings would only work if Ingenico actually used the auto gain control algorithm that it was taught by BBPOS in order for these to work properly and provide reliable communication." Doc. No. 347 at 42. In coming to this deduction, he also relied on "the fact

that the communication formats designed by BBPOS require the use of a preamble to train the auto gain control circuit." Doc. No. 347 at 43.

162. Zatkovich went on to explain that he was able to determine that Ingenico had the same parameters, even without access to Ingenico's software, by using a public version of Ingenico's SDK from the Internet; then, using source code he requested from BBPOS, to access the BBPOS SDK housed below Ingenico's top layer of its unified SDK, but which is otherwise obfuscated; and, only, then, was he able to decompile the object code into source code to identify Ingenico's particular settings used in the Accused Products. Doc. No. 347 at 45.

d. Communication Formats

163. Zatkovich explained the nature and purpose of this key design as a means of addressing the particular requirements BBPOS' customer may have for the card swipe data to enable its mobile payment software on the mobile phone to communicate with its devices. In other words, the customer's payment application needs to know exactly how that data is going to be transmitted to properly recognize the data being sent. Doc. No. 347 at 47.

164. This requires BBPOS to sit with the client, define what their general requirements are for that data, and then put together a very specific sequence of data fields, which will encapsulate that information in a particular size, in a particular format, i.e., the communication format specification. Doc. No. 347 at 47; Ex. 817 (demonstrative purposes: ref: Slide 13); Ex. 371.

165. The customer neither sets nor is even given access to the communication format specification that BBPOS will use, but rather it just says "We want this type of data"; it is then up to BBPOS to decide exactly how and where that is going to be transmitted within the transaction. Doc. No. 347 at 48–49. Each of the 25 different communication formats that

BBPOS defined has an API (or application program interface) with parameters that it expects to see in order to retrieve the data, and that is built into BBPOS' SDK. *Id.*

166. Zatkovich testified that he had determined that Ingenico's Accused Products utilize BBPOS communication formats, for practical reasons as well as based on his review of Ingenico's own internal documents, specifically requiring support for BBPOS' Formats 11 and 29, noting:

> Well, first and foremost, any customer who wants to support or sell devices to BBPOS' clients would almost certainly have to support the formats that were defined for those clients, short of the clients modifying their payment software and having to distinguish multiple sets of devices, which is -- would be difficult for the client. In addition to that, Ingenico's own product requirements identified the use of at least two of the formats, Format 11 and Format 29, that BBPOS defined. And that's listed in Exhibit 207.

Doc. No. 347 at 57; Ex. 207. Tang further confirmed that Ingenico utilized BBPOS communication formats by reviewing Ingenico product requirement documents. Doc. No. 349 at 115–118 (stating that information in the document is a "blatant copy" of the BBPOS information.

e. Modified Data DUKPT

167. Zatkovich determined that BBPOS developed their own proprietary version of the standard DUKPT encryption key, which it calls the Data DUKPT, that it utilizes for certain of its communication formats including, Format 11 and Format 29, noting "[i]f you wish to support those two customers using an mPOS device with those formats, then you are required to use the data DUKPT key, encryption key." Doc. No. 347 at 60–61.

168. Thus, based on substantially the same reasons he had concluded that Ingenico used BBPOS' communication format key design, he likewise concluded it necessarily also used BBPOS' modified data DUKPT trade secret. Doc. No. 347 at 60–62; Ex. 207.

169. Tang also noted that Ingenico's own product requirement documents mandated the use of BBPOS encryption, in order "to be compatible to our [BBPOS] readers." Doc. No. 349 at 118; Ex. 207.

170. A 2014 marketing pitch directed to PayPal, in particular, highlighted that not only did Ingenico use these two key designs in its accused products, it did so with deliberation and an appreciation of economic benefits of the "customer stickiness" these two BBPOS key designs had been designed to achieve (but for the benefit of BBPOS), in touting a "seamless integration" from the BBPOS G5X to the RP series. Ex. 828.

XIII. BBPOS Key Design Protections

171. In addition to the specific protections utilized in this case as discussed in Section V, above, Lo provided testimony related to the measures that BBPOS takes generally to secure its intellectual property. First, all documents, including all trade secrets and other confidential information, are stored on secured servers in BBPOS' data room. Doc. No. 351 at 138. The server can only be accessed by a company-issued computer, and the computer is protected with a username and password of at least eight numeric digits. Doc. No. 351 at 138. The passwords are changed frequently. Doc. No. 351 at 139. The trade secrets have never been disclosed publicly. *Id.*

172. The server is only accessible to Lo and two chief engineers, including Daniel Tsai, Chief Hardware Architect, and Jimmy Tang, Chief Software Architect. Doc. No. 351 at 139. Other engineers at BBPOS have access to specific documents that relate to their employment, which are accessible on a need-to-know basis. Doc. No. 351 at 139.

173. BBPOS also requires all customers to execute NDAs. Doc. No. 351 at 139. All BBPOS employees must also sign employment agreements, which contain confidentiality provisions. Doc. No. 351 at 140.

174. BBPOS engages contract manufacturers to handle the physical manufacturing of the devices it designs. Doc. No. 351 at 141. BBPOS requires its contract manufacturers to execute NDAs. Doc. No. 351 at 141.

175. BBPOS has an in-house quality assurances director who routinely conducts audits of BBPOS' contract manufacturer sites to ensure that proper security measures are in place. Doc. No. 351 at 141.

XIV. Damages

176. All five of BBPOS' misappropriated key designs appeared in four different series of Ingenico products, including the RP100 (including the RP100x, RP150x, RP170c); RP 350 (including the RP350x); RP450 (including the RP456, RP457c); and RP750 (including the RP750x, RP755x, P757cx). Doc. No. 346 at 106; Doc. No. 347 at 14–18, 25–30, 40–45, 52–54, 56–57, 62; *cf.* Exs. 372 and 208; Ex. 817 (demonstrative purposes); Ex. 193; *cf.* Exs. 118 and 208; Ex. 207; Ex. 192; Ex. 193; Ex. 199; Ex. 209; Ex. 217; Doc. No. 349 at 112–118; *cf.* Exs. 451A and 207; *cf.* Exs. 371 and 207.

177. According to sales records produced by Ingenico for all mPOS products, which covered January 2014 through March 2023, see Exs. 472, 473, 727, the first Accused Product appears in the sales data in February 2014. Ex. 472; Doc. No. 350 at 118, 129.

178. Plaintiff's expert witness on damages, Stephen Scherf, testified that an appropriate method for calculating damages in this case is based on a measure of unjust enrichment, which he applied here. Doc. No. 350 at 60. To do this, Scherf identified the number of Accused Products sold by Ingenico and then calculated Ingenico's revenues and gross profits derived therefrom. Doc. No. 350 at 60.

179. Ingenico's own documentation provided revenue and gross profit figures for the Accused Products. Doc. No. 350 at 62. Scherf determined that there were 1,294,808 accused units that

were sold, totaling $57,315,682 in revenue and $23,989,964 in gross profit. Doc. No. 350 at 62–63; Ex. 823. Ingenico offered no evidence of any "incremental costs" at trial.

180. Each of the Accused Products that Ingenico produced in discovery had an audio jack interface. Doc. No. 346 at 103. However, where other devices within those series were known to have existed, but for whatever reason were withheld by Ingenico, Zatkovich reasonably assumed that the versions produced were representative of the entire series. *Id.* No devices within the RP100 product series were produced by Ingenico, but Zatkovich was able to locate two or three of those devices on eBay. *Id.*

181. Rotsaert testified that two products did not have audio jacks, the RP755 and the RP457c-BT. Doc. No 353 at 132, 137. Rotsaert specifically stated that the RP457c contains audio jack and Bluetooth capability. Doc. No. 353 at 136. Defendants did not produce a sample of the RP755 during discovery.

182. Ingenico argued at trial that the RP457c-BT was "part of Plaintiff's damages case." Doc. No. 353 at 138. That statement misrepresents the evidence. Gross profit by product can be determined from the sales data spreadsheets relied upon by Scherf. The gross profit for each Accused Product is as follows:

Product	**Gross Profit**
RP100x	$0
RP150	$13,588.00
RP170c	$6,701.55
RP350x	$4,334,593.20
RP456	$0
RP457c	$15,940,481.97

RP750x	$0
RP755x	$404,623.47
RP757c	$3,315,480.13
RP757cx	$0
Total:	$24,015,468.32[17]

Exs. 472, 473, 727.[18]

183. The data provided by Ingenico shows an additional $455,130 in gross revenue for the RP457c-BT. Ex. 472, 473, 727. This number is not included in BBPOS' unjust enrichment calculation.

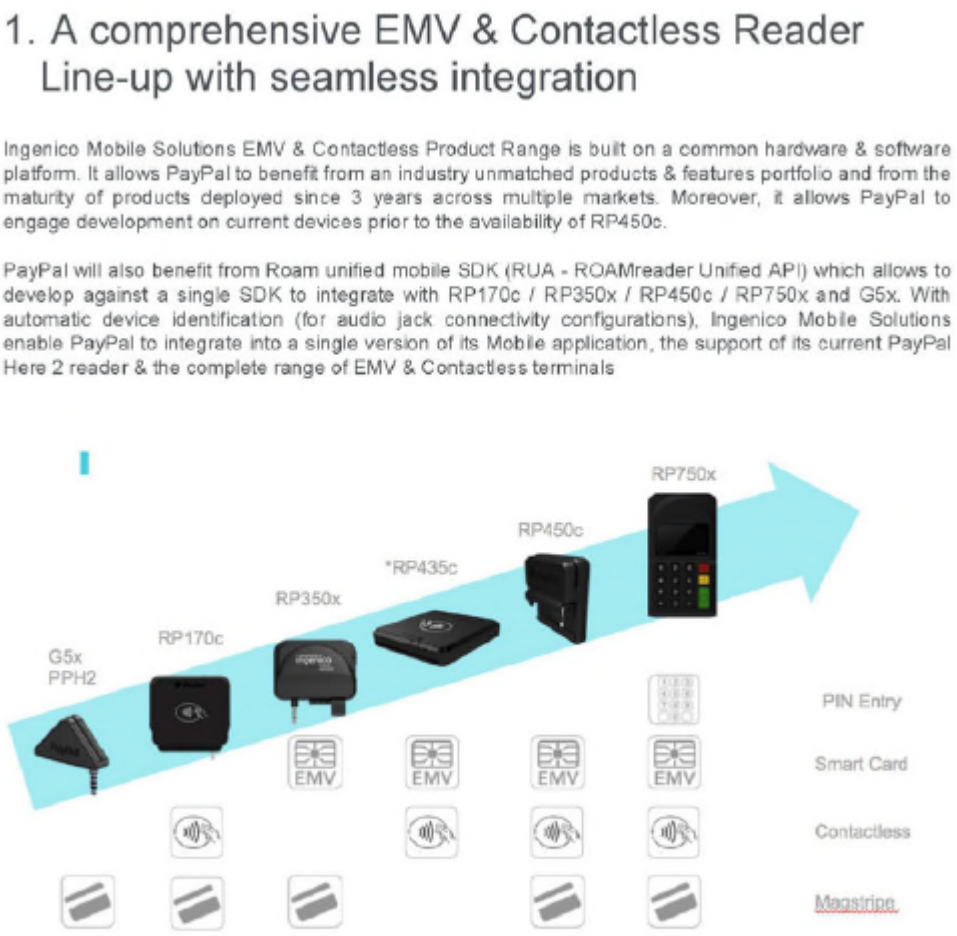
184. In addition, the use of trade secrets four and five — communication formats and modified DUKPT — are not dependent on the existence of an audio jack. Doc. No. 354 at 54–55.

185. As to the customer stickiness value of the trade secrets, Rotsaert testified that it permitted products within a given mPOS developer's portfolio to complement each other, much like when a customer who owns an iPhone buys a newer iPhone. Doc. No. 354 at 27-28. In 2014, Ingenico marketed to PayPal "seamless integration" from the BBPOS G5X to the RP series, which was only made possible by Ingenico's use of the BBPOS communication formats and

[17] The total figure here is $25,644 greater than the number that Scherf testified to at trial, $23,989,824. The reason for this is an internal data inconsistency in Exhibit 727 whereby the amounts for the "product family" are slightly less than the more detailed "product." Scherf relied upon the more conservative figure.

[18] The demonstrative table was not used at trial, but can be confirmed from the Exhibits 472, 473, and 727 in evidence. A breakdown of gross profit by product is only necessary if the Court accepts Defendants' argument that that the RP755 should not be included because it lacks an audio jack—a fact that Defendants withheld until trial by failing to produce the device (or raise the argument) in discovery.

modified DUKPT. Ex. 828. The below excerpt, which was prepared for PayPal in 2014, demonstrates how Ingenico was able to market this seamless integration to major customers:



Ex. 828.

186. Defendants offered an expert on damages, Dr. Jennifer Vanderhart. Vanderhart testified that Scherf's unjust enrichment calculation double-counted certain units of Accused Products, which caused his calculation to be overstated by approximately $300,000. Doc. No. 350 at 78.

187. Vanderhart also conducted a "reasonable royalty" analysis and determined that BBPOS' damages should be limited to $2,704,484. Doc. No. 354 at 136–37. She used the royalty rate

of $2-$3 per unit based on the 2010 Licensing Agreement, which provided a royalty rate for the older CircleSwipe. Doc. No. 354 at 156.

188. Lo testified that he never agreed on a royalty rate for any next generation mPOS device. Doc. No. 352 at 10.

189. Moreover, Graylin essentially disproved Vanderhart's use of the Licensing Agreement as a reliable benchmark, testifying at trial that the joint development of a new EMV would necessitate a new commercial agreement with new economics. Doc. No. at 348 at 20–21; Doc. No. 348 at 114 (testifying further to this point, "So -- and the two to three dollars that we talked about previously were for products that were existing, were selling existingly. And the new products was more sophisticated. It had more components. So, likely, we had to renegotiate and figure out what the, you know, cost per unit was going forward, right, for the new product.").

XV. Select Instances of Willful and Malicious Conduct

190. Throughout the relevant time period, there were numerous instances of willful and malicious conduct by Ingenico, including the following:

a. The May 2, 2012 email where top Ingenico executives expressed concern about the sending of BBPOS information to third parties. Ex. 820. The email stated, "I think that it is also necessary to mention the transmission of the BBPOS manufacturing records to third parties by the Group in order to reduce the risk of being taken hostage by BBPOS if the deal doesn't go through. We have discussed this matter with Ch. Rotsaert and that it would be appropriate to act formally at the board meeting." Ex. 820.

b. Lazare's June 2012 message to Lo that: "You have the terms. You have the term sheet. Either sign the term sheet as is with no changing of any clause in the term sheet, or I'm going to kill your company." Doc. No. 351 at 136.

c. Rotsaert's September 6, 2012 email – sent after Graylin had instructed him to cease sending BBPOS' confidential information to Ingenico – where Rotsaert instructed Ingenico engineers to press them on preparing information "received during workshop in HK" and noted that "even without a source code, we have obtained a significant amount of details on their solution…" Ex. 822.

d. Rotsaert's September 16, 2012 email, informing Graylin that Ingenico was utilizing BBPOS' intellectual property to develop a competing mPOS device. Ex. 175 ("As Roam has been using BBPOS as a design house for swiper. we are leveraging ingenico internal development capacity to develop this EMV product.").

e. In that same email, Rotsaert suggested to Graylin that the Ingenico internal development approach "will be profitable to Roam to the extend [sic] that Roam will benefit from ingenico's design capacity & technology." Ex. 175.

f. ROAM and Ingenico's termination of Graylin following Graylin's refusal to acquiesce to the intellectual property transfers to Ingenico. Doc. No. 348 at 63.

g. Rotsaert's September 26, 2012 email to "Fred" at Landi – shortly after Graylin's termination: "Please find clarification from [ROAM Engineer] John Chiu. Please confirm it is now more clear. I apologize for time we lost. Until Monday September 24, 2012, I could not involve yet John in the project & I made some wrong assumptions." Ex. 182.

h. The same day, "Fred" at Landi responded to Rotsaert, asking for clarification on Rotsaert's instructions regarding implementation of ROAM's Swiper API, which utilized BBPOS key designs, writing in relevant part:

> Hi Christopher,
>
> It's my mistake that didn't learn the proposal correctly.
> The purpose to provide API doc to you is confirm by each other. Fortunately John can point out the difference immediately.
>
> I feel that there are 2 different opinion between you and John.
> --John said "Do not change the package".
>
> --Your proposal is "The Swiper API should be as close as possible to Roam Swiper API but not exactly the same for IP reason".
>
> Out team had a meeting to discuss your email, and we thought it is easier to implement SwiperController class which is defined by <SwiperController.java> than a similar class. Could you give us a clear information?

Ex. 182.

i. Chiu's responses, also dated September 26, 2012, instructing that the SDK package should not be changed, and noting in a later email on the same day that the "Android Swiper SDK" would be sent to Landi "some time today." Ex. 182. BBPOS had provided Rotsaert with the Android Swiper API and implementation guide months earlier. Doc. No. 349 at 109; Ex. 72, 73.

j. Ken Paull's January 19, 2013 email to Lo, falsely stating that the new competing Ingenico EMV device shared "no commonality in terms of architecture, firmware or power" between the BBPOS device and the new Ingenico device. Ex. 200.

k. The May 2013 email thread between Rotsaert and Landi, where in response to questions from Landi about intellectual property issues, Rotsaert writes, "I cannot use my mail to describe more in detail because in US, I may be obliged someday

to share my emails. I come back to your office to explain and provide some reference." Ex. 215.

XVI. Ingenico's Counterclaim for Indemnification

191. Ingenico brought a counterclaim for indemnification of legal fees and a settlement payment incurred in defending patent infringement claims involving BBPOS products. Doc. No. 354 at 72–75. The indemnification requirement stemmed from the 2010 Licensing Agreement. Doc. No. 354 at 75.

192. Four indemnification demands were made, the first occurring on January 19, 2017. Ex. 1146. Kerry Timbers gave testimony as to the work performed and the indemnification letters.

193. BBPOS responded to all indemnification demands by letter dated November 2, 2018. Ex. 353. BBPOS sought more information from Timbers relating to the alleged infringing products, including the models, number of units sold, dates of sale, and purchase price. Ex. No. 353. Timbers never responded.

194. Timbers testified that the work performed and submitted for indemnification was not apportioned by product or customer. Doc. No. 354 at 122. Timbers admitted that at least three of the four matters submitted for indemnification to BBPOS included work for products other than BBPOS products. Doc. No. 354 at 122–24. Timbers testified that, as to one of the indemnification matters, about 80% of the products were BBPOS products, and 20% were not. Doc. No. 354 at 128. Yet neither Timbers nor Ingenico made any attempt to apportion the legal bills according to time spent on the BBPOS products, nor was any discount applied.

Respectfully submitted:

/s/ Oliver D. Griffin

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Dated: May 26, 2023

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CERTIFICATE OF SERVICE

I, Melissa A. Bozeman, do hereby certify that on May 26, 2023, I served a true and correct copy of the foregoing Proposed Findings of Fact on all parties via the Court's CM/ECF Electronic Filing System.

/s/Melissa A. Bozeman
Melissa A. Bozeman